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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant(s): Patrick BROUHON, et al.

U.S. Serial No.: 10/661,000

Group: 2854

Filing Date: September 10, 2003

Our Ref.: B-5233 621240-1

For: "METHODS AND APPARATUS FOR GENERATING IMAGES"

Date: September 2, 2004

MAIL STOP PETITION
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

ATTN: Ms. Patricia Faison-Ball
Office of Petitions

REQUEST FOR RECONSIDERATION OF PETITION UNDER 37 CFR 1.47(a)

Dear Ms. Faison-Ball:

In response to the Decision Refusing Status Under 37 CFR 1.47(a) mailed on July 2, 2004 (copy enclosed), please find enclosed herewith the following items:

(1) a Verified Statement of Details of Efforts to Reach Nonsigning Inventor (Supplement to Statement of Facts in Support of Filing on Behalf on Nonsigning Inventor) signed by Ms. Loles Fores, accompanied by:

- copies of the e-mail sent to the nonsigning inventor and the enclosures attached thereto, including a copy of the application as filed and an unsigned Declaration/Power of Attorney and assignment document,
- a copy of a DHL website printout confirming delivery of the confirmation courier package sent to the nonsigning inventor
- copies of two e-mails from a personal shipping service confirming the order and the delivery of the confirmation courier package; and

(2) a Verified Statement of Details of Efforts to Reach Nonsigning Inventor (Supplement to Statement of Facts in Support of Filing on Behalf on Nonsigning Inventor) signed by Ms. Suzanne Johnston, which details the attempts made to reach the nonsigning inventor by telephone.

The Applicants believe that the enclosed Verified Statements of Details of Efforts to Reach Nonsigning Inventor satisfy Item (1) as described in the Decision Refusing Status Under 37 CFR 1.47(b). The Applicants respectfully request that the Petition Under 37 CFR 1.47(a) be granted upon consideration of the enclosed evidence.

The Commissioner is authorized to charge any additional fees which may be required or credit overpayment to deposit account no. 12-0415.

I hereby certify that this correspondence is being deposited with the United States Postal Service with sufficient postage as first-class mail in an envelope addressed to "MAIL STOP PETITION, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450", on September 2, 2004 by Suzanne Johnston.

Respectfully submitted,

Richard P. Berg
Attorney for Applicant
Reg. No. 28,145

LADAS & PARRY
5670 Wilshire Boulevard
Suite 2100
Los Angeles, CA 90036
(323) 934-2300

Enclosure: as listed

UNITED STATES PATENT AND TRADEMARK OFFICE

200207059-1

Commissioner for Patents
United States Patent and Trademark Office
P.O. Box 1450Alexandria, VA 22313-1450
www.uspto.gov

HEWLETT-PACKARD COMPANY
INTELLECTUAL PROPERTY ADMINISTRATION
P.O. BOX 272400
FORT COLLINS CO 80527-2400

HP LEGAL
IPA

COPY MAILED

JUL 0 2 2004

OFFICE OF PETITIONS

In re Application of :
Patrick Brouhon et al. :
Application No. 10/661,000 : DECISION REFUSING STATUS
Filed: September 10, 2003 : UNDER 37 CFR 1.47(a)
Attorney Docket No. B-5233 621240-1 :

This decision is in response to the petition filed May 27, 2004 (with a four month extension of time request), under 37 CFR 1.47(a), in response to the Notice to File Missing Parts "Notice" mailed December 2, 2003.

The petition is **DISMISSED**.

Rule 47 applicant is given TWO MONTHS from the mailing date of this decision to respond, correcting the below-noted deficiencies. Any response should be entitled "Request for Reconsideration of Petition Under 37 CFR 1.47(a)" and may include an oath or declaration executed by the inventor. **Failure to respond will result in abandonment of the application.** Any extensions of time will be governed by 37 CFR 1.136(a).

The above-identified application was filed on September 10, 2003, naming Patrick Brouhon and Ira Goldstein but without a signed declaration. Accordingly, on December 2, 2003, a "Notice of Incomplete Application" was mailed, requiring *inter alia* a properly executed oath or declaration.

In response, the present petition was filed with an oath or declaration signed by inventor Brouhon on his own behalf and on behalf of non-signing inventor Goldstein. Petitioners seek status under 37 CFR 1.47(a) based on the fact that on more than one occasion email messages with the declaration and power of attorney and assignment papers were mailed to Mr. Goldstein at the last known email address, that telephone messages were left at Mr. Goldstein's last known telephone number and that letters were mailed to Mr. Goldstein at his last known address, but Mr. Goldstein has neither acknowledged receipt of the email messages or the mailings delivered by DHL Courier, returned an executed oath or declaration or returned the telephone calls. Petitioner claims that they have put forth diligent efforts to have the oath or declaration executed and that Mr. Goldstein has refused to comply.

A grantable petition under 37 CFR 1.47(a) requires:

(1) proof that the non-signing inventor cannot be reached or refuses to sign the oath or declaration after having been presented with the application papers (specification, claims and drawings);

(2) an acceptable oath or declaration in compliance with 35 U.S.C. §§ 115 and 116;

(3) the petition fee; and

(4) a statement of the last known address of the non-signing inventor.

The present petition lacks item (1).

In regards to item (1), petitioners have not provided sufficient proof that a copy of the application (specification, including claims, drawings, if any, and the declaration) was sent to the non-signing inventor. The petition shows that the declaration and the assignment were attached to the email messages sent to Mr. Goldstein but there is nothing to show that the complete application was sent to Mr. Goldstein. Thus, there is no evidence to show that Mr. Goldstein had the benefit of seeing the application.

Petitioners may show proof that a copy of the application was sent or given to the non-signing inventors for review by providing a copy of the cover letter transmitting the application papers to the non-signing inventors or details given in an affidavit or declaration of facts by a person having first hand knowledge of the details.

Likewise, before a *bona fide* refusal can be shown, the non-signing inventor must have been given an opportunity to review the application. Therefore, petitioners must show proof that the non-signing inventor refuses to sign the declaration after being sent or given a copy of the application papers. If there is a written refusal, petitioners should submit a copy of that refusal with any renewed petition. If the refusal was made orally to a person, then that person must provide details of the refusal in an affidavit or declaration of facts.

Further correspondence with respect to this matter should be addressed as follows:

By mail: Mail Stop Petitions
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

By FAX: (703) 872-9306
Office of Petitions

Telephone inquiries concerning this matter may be directed to the undersigned Petitions Attorney at (703)305-4497.

Patricia Faison-Ball

Patricia Faison-Ball
Senior Petitions Attorney
Office of Petitions

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant(s): Patrick BROUHON, et al.

U.S. Serial No.: 10/661,000

Group: 2854

Filing Date: September 10, 2003

Our Ref.: B-5233 621240-1

For: "METHODS AND APPARATUS FOR GENERATING IMAGES"

VERIFIED STATEMENT OF DETAILS OF EFFORTS TO REACH NONSIGNING INVENTOR (SUPPLEMENT TO STATEMENT OF FACTS IN SUPPORT OF FILING ON BEHALF OF NONSIGNING INVENTOR)

I, the undersigned, hereby state that the following attempts were made to reach the nonsigning inventor, Ira Goldstein, and that I am the person most knowledgeable of facts surrounding the below listed attempts to reach the nonsigning inventor of the above-identified application.

On July 15, 2004, I sent a copy of the application as filed with a blank Declaration/Power of Attorney via e-mail to Mr. Ira Goldstein's last known e-mail address. A copy of the e-mail to the inventor is enclosed herewith.

I sent a confirmation copy of my e-mail with a copy of the application as filed and a blank Declaration/Power of Attorney via DHL courier to Mr. Ira Goldstein's last known physical address. Copies of a printout from the DHL website and two e-mails from a personal shipping service are enclosed herewith as evidence that the application papers were delivered to the inventor's last known address.

As stated in the Verified Statement signed by Suzanne Johnston (which is being filed concurrently herewith), Mr. Goldstein confirmed receipt of the package in a telephone conversation and

indicated that he would review and the papers in connection with this application. However, the papers were never returned to the Applicant, and subsequent attempts to contact the inventor by telephone were unsuccessful because the last known telephone number was disconnected.

On information and belief, I believe that a diligent effort has been made to contact the nonsigning inventor, Ira Goldstein, in connection with this application.

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Date: 20th August 2004

Typed/printed name of the person making this statement

Loles Fores

Signature

Post Office Address AVDA. GRACIA 501; 08174 SANT CUGAT DEL VALLES; BARCELONA; SPAIN

Johnston,Suzanne

From: Fores, M Dolores (Loles)
Sent: Thursday, July 15, 2004 9:28 AM
To: ira@goldstein.org
Cc: Fores, M Dolores (Loles); Druguet, Montserrat
Subject: 200207059-1 >> APPLICATION AS FILED: PLEASE SIGN US DEC & ASSG
Importance: High

K8KD.PDF

US_HPDC_Assg_Goldstein.pdf

us_dec.pdf

Dear Ira

We've enclosed the final copy of the patent application entitled ("Methods And Apparatus For Generating Images") that was filed with the United States Patent and Trademark Office for your invention disclosure. Be sure to contact us immediately at the number below if you find any problems in the application.

We've also enclosed the documents necessary to complete the application which was filed with the Patent and Trademark Office. The Declaration and Power of Attorney is an important document and serious penalties may be imposed for willful false statements made on it. Please read it carefully and make sure that you understand it and agree with what it says. If so, verify your address and sign and date (in BLUE ink) at the bottom of the page in the space below your name. If your address is incorrect, please line through it and clearly print or type the correction and initial the change.

The US Assignment assigns your rights in the patent application to HP in accordance with your employment agreement. Please read the Assignment over and then sign exactly as typed, and date (in BLUE ink) it.

You should note that both HP and all of the listed inventors have a duty of candor to the US patent and Trademark Office. This means that we must advise the Office of any prior art we know of that would be relevant in the Office's examination of the application. Please let me know if you think of any information that we need to cite to the Office.

Thank you for your help in completing the Declaration and Assignment. Please return all the completed documents to me as soon as you can. The copy of the patent application is yours to keep. If you have any questions, please feel free to call me at the number listed below.

Best regards,

Loles Fores
Hewlett Packard Española, S.L.
IP Legal Department

Tel: +34 93 582 2084
Fax: +34 93 582 2373
mailto: loles.fores@hp.com

<<K8KD.PDF>> <<US_HPDC_Assg_Goldstein.pdf>> <<us_dec.pdf>>

PATENT APPLICATION

DECLARATION AND POWER OF ATTORNEY FOR PATENT APPLICATION

ATTORNEY DOCKET NO. 200207059-1

As a below named inventor, I hereby declare that:

My residence/post office address and citizenship are as stated below next to my name;

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled:

Methods And Apparatus For Generating Images

the specification of which is attached hereto unless the following box is checked:

(X) was filed on Sep 10, 2003 as US Application No. or PCT International Application Number 10/661000 and was amended on _____ (if applicable).

I hereby state that I have reviewed and understood the contents of the above-identified specification, including the claims, as amended by any amendment(s) referred to above. I acknowledge the duty to disclose all information which is material to patentability as defined in 37 CFR 1.56.

Foreign Application(s) and/or Claim of Foreign Priority

I hereby claim foreign priority benefits under Title 35, United States Code Section 119 of any foreign application(s) for patent or inventor(s) certificate listed below and have also identified below any foreign application for patent or inventor(s) certificate having a filing date before that of the application on which priority is claimed:

COUNTRY	APPLICATION NUMBER	DATE FILED	PRIORITY CLAIMED UNDER 35 U.S.C. 119
			YES: ___ NO: ___
			YES: ___ NO: ___

Provisional Application

I hereby claim the benefit under Title 35, United States Code Section 119(e) of any United States provisional application(s) listed below:

APPLICATION NUMBER	FILING DATE

U. S. Priority Claim

I hereby claim the benefit under Title 35, United States Code, Section 120 of any United States application(s) listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States application in the manner provided by the first paragraph of Title 35, United States Code Section 112, I acknowledge the duty to disclose material information as defined in Title 37, Code of Federal Regulations, Section 1.56(a) which occurred between the filing date of the prior application and the national or PCT international filing date of this application:

APPLICATION NUMBER	FILING DATE	STATUS (patented/pending/abandoned)

POWER OF ATTORNEY:

As a named inventor, I hereby appoint the following attorney(s) and/or agent(s) to prosecute this application and transact all business in the Patent and Trademark Office connected therewith:

Customer Number 022879

Place Customer Number Bar Code Label here

Send Correspondence to:
HEWLETT-PACKARD COMPANY
Intellectual Property Administration
P.O. Box 272400
Fort Collins, Colorado 80527-2400

Direct Telephone Calls To:
Richard P. Berg
323 934 2300

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Full Name of Inventor: Patrick Brouhon **Citizenship:** BE

Residence: 214 Chemin des Reposes 38410 Saint Martin d'Uriage France

Post Office Address: Same as Residence

Inventor's Signature _____ Date _____

DECLARATION AND POWER OF ATTORNEY FOR PATENT APPLICATION (continued)

ATTORNEY DOCKET NO. 200207059-1

Full Name of joint inventor: Ira Goldstein Citizenship: US

Residence: 790 Strawberry Hill Road Concord MA 01742

Post Office Address: Same as residence

Inventor's Signature Date

Full Name of joint inventor: Citizenship:

Residence:

Post Office Address:

Inventor's Signature Date

Full Name of joint inventor: Citizenship:

Residence:

Post Office Address:

Inventor's Signature Date

Full Name of joint inventor: Citizenship:

Residence:

Post Office Address:

Inventor's Signature Date

Full Name of joint inventor: Citizenship:

Residence:

Post Office Address:

Inventor's Signature Date

Full Name of joint inventor: Citizenship:

Residence:

Post Office Address:

Inventor's Signature Date

Full Name of joint inventor: Citizenship:

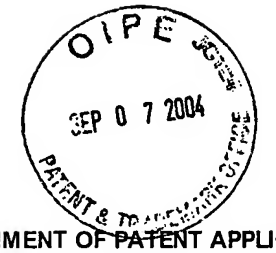
Residence:

Post Office Address:

Inventor's Signature Date

When recorded please return to:

HEWLETT-PACKARD COMPANY
Intellectual Property Administrator
P. O. Box 272400
Fort Collins, Colorado 80527-2400



PATENT APPLICATION

ATTORNEY DOCKET NO. 200207059-1

ASSIGNMENT OF PATENT APPLICATION

I/We, the undersigned (each) have agreed and hereby agree to assign to HEWLETT-PACKARD DEVELOPMENT COMPANY, L.P., a Texas Limited Partnership having its principal place of business in Houston, Texas, (hereinafter HPDC), in furtherance of my/our obligations to the Hewlett-Packard Company and its subsidiaries and affiliates, and do hereby assign and transfer to HPDC, its successors and assigns, the entire right, title and interest, including the right of priority, in, to and under an application for Letters Patent of the United States entitled:

Methods And Apparatus For Generating Images

Filing date: **10th. September 2003** Application No.: **10/661,000**

and the invention(s) and improvement(s) set forth therein, and any and all continuations, continuations-in-part (C-I-P's), divisionals, and renewals of and substitutes for said application for said Letters Patent, and any and all Letters Patent of the United States and of countries foreign thereto which may be granted thereon or therefor; and any reissues, or reexaminations, or extensions of said Letters Patent.

I/we additionally authorize HPDC to file applications in my/our name for Letters Patent in any country, to be held and enjoyed by HPDC, its successors, assigns, nominees or legal representatives, to the full end of the term or terms for which said Letters Patent respectively may be granted, reissued or extended, as fully and entirely as the same would have been held and enjoyed by me/us had this assignment, and transfer not been made;

AND I/we hereby covenant that I/we have full right to convey the entire interest herein assigned, and that I/we have not executed and will not execute any agreement in conflict herewith, and I/we further covenant and agree that I/we will, each time a request is made, and without undue delay, execute and deliver all such papers as may be necessary or desirable to perfect the title to said invention(s) or improvement(s), said application and said Letters Patent, to HPDC, its successors, assigns, nominees or legal representatives, and I/we agree to communicate to HPDC, or to its nominee, all known facts respecting said invention(s) or improvement(s), said application and said Letters Patent, to testify in any legal proceedings, to sign all lawful papers, to execute all disclaimers and divisionals, continuations, C-I-P's, reissue and foreign applications, to make all rightful oaths and declarations, and generally to do everything possible to aid HPDC, its successors, assigns, nominees and legal representatives to obtain and enforce, for its or their own benefit, proper patent protection for said invention(s) or improvement(s) in any and all countries provided the expenses which may be incurred by me/us in lending such cooperation and assistance are paid by HPDC;

AND I/we hereby authorize and request the Commissioner of Patents and Trademarks of the United States and any official of any country or countries foreign to the United States whose duty it is to issue patents on applications as aforesaid, to issue to HPDC, as assignee of the entire right, title and interest, any and all Letters Patent for said invention(s) or improvement(s), including any and all Letters Patent of the United States which may be issued and granted on or as a result of the application aforesaid, in accordance with the terms of this assignment.

I/we further authorize and direct the attorneys of record to insert the serial number and filing date of said application now identified by the attorney docket number and title set forth above as soon as the same shall have been made known to them by the United States Patent and Trademark Office.

IN WITNESS WHEREOF, I/we hereunto set my/our hand(s) and seal(s):

_____ Date Assignment Signed: _____
Inventor's Signature (Seal)

Inventor's Typed Name: Ira Goldstein Date Application Signed: _____

State of)
) ss.:
County of)

Before me this ____ day of _____, personally appeared Ira Goldstein who is personally known or proved to me on the basis of satisfactory evidence to be the person who acknowledged the foregoing instrument of assignment to be his/her free act and deed.

_____
Notary Public
My commission expires:

When recorded please return to:

HEWLETT-PACKARD COMPANY
Intellectual Property Administration
P. O. Box 272400
Fort Collins, Colorado 80527-2400

PATENT APPLICATION

ATTORNEY DOCKET NO. 200207059-1

ASSIGNMENT OF PATENT APPLICATION (cont.)

IN WITNESS WHEREOF, I/we hereunto set my/our hand(s) and seal(s):

_______________________ Date Assignment Signed: _______________
Inventor's Signature (Seal)

Inventor's Typed Name: _______________ Date Application Signed: _______________

State of)
) ss.:
County of)

Before me this ____ day of ______________, personally appeared ______________________ who is personally known or proved to me on the basis of satisfactory evidence to be the person who acknowledged the foregoing instrument of assignment to be his/her free act and deed.

Notary Public
My commission expires:

_______________________ Date Assignment Signed: _______________
Inventor's Signature (Seal)

Inventor's Typed Name: _______________ Date Application Signed: _______________

State of)
) ss.:
County of)

Before me this ____ day of ______________, personally appeared ______________________ who is personally known or proved to me on the basis of satisfactory evidence to be the person who acknowledged the foregoing instrument of assignment to be his/her free act and deed.

Notary Public
My commission expires:

_______________________ Date Assignment Signed: _______________
Inventor's Signature (Seal)

Inventor's Typed Name: _______________ Date Application Signed: _______________

State of)
) ss.:
County of)

Before me this ____ day of ______________, personally appeared ______________________ who is personally known or proved to me on the basis of satisfactory evidence to be the person who acknowledged the foregoing instrument of assignment to be his/her free act and deed.

Notary Public
My commission expires:

(Use Page Three For Additional Inventor(s) Signature(s))

Rev 10/03 (Assign)

Express Mail Number: EV301023981US

Docket No. B-5233 621240-1
Date: September 10, 2003

Mail Stop Patent Application
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

CLIENTS COPY

Sir:

NEW APPLICATION TRANSMITTAL

Transmitted herewith for filing is the patent application of

Inventor(s): (1) Patrick BROUHON
(2) Ira GOLDSTEIN

NOTE: Patent must be applied for in the name of all of the actual inventor or inventors.

For: "METHODS AND APPARATUS FOR GENERATING IMAGES"

Enclosed are:

1. **The Papers Required For Filing Date Under 37 CFR 1.53(b):**

17 Pages of specification 1 Page of abstract 9 Pages of claims

7 Sheets of drawings [ ] formal [X] informal
(Figs. 1-8)

[X] In addition to the above papers there is also attached

[ ] _ Pages of a Preliminary Amendment dated _

[X] Postcard
[ ] Check for filing fee in the amount of $
[X] Unsigned Declaration/Power of Attorney (2 pages)
[ ] Verified Statement Claiming Small Entity Status--
Small-Business Concern (1 page)
[X] Cross-Reference To Related Application(s) (1 page)
[ ] Claim to Priority (1 page) with
[ ] Certified Copies of
[ ] Information Disclosure Statement (2 pages) and
Form PTO-1449 (modified) (1 page) with
copies of documents cited in Form PTO-1449 (modified)
[ ] Assignment Cover Sheet (1 page), Assignment document (1 page),
and Check for $40.00

CERTIFICATION UNDER 37 CFR 1.10

I hereby certify that this paper and the documents referred to as enclosed therein are being deposited with the United States Postal Service in an Express Mail envelope with sufficient postage for Express Mailing on this date September 10, 2003 in an envelope as "Express Mail Post Office to Addressee" Mailing Label Number **EV301023981US** addressed to the:

Mail Stop Patent Application
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

2. **Declaration or oath**

[ ] Enclosed

[ ] original [ ] facsimile

executed by:

[ ] inventor(s)

[ ] legal representative of inventor(s) 37 CFR 1.42 or 1.43

[ ] joint inventor or person showing a proprietary interest on behalf of inventor who refused to sign or cannot be reached. 37 CFR 1.47.

[ ] petition and statement required by 37 CFR 1.47 also attached. See item 7 below for fee.

[X] Not Enclosed

[X] Application is made by a person authorized under 37 CFR 1.41(c) on behalf of all of the above named inventor(s). The declaration or oath, along with the surcharge required by 37 CFR 1.16(e) can be filed subsequently.

[ ] Showing that the filing is authorized. (Not required unless called into question. 37 CFR 1.41(d)).

NOTE: Where the filing is a completion in the U.S. of an international application under 35 U.S.C. 371(c)(4) then the declaration must be filed.

3. **Assignment**

[ ] An assignment of the invention to

(with separate cover sheet and separate check for $40.00)

4. **Certified Copies**

[ ] Certified copy of Application No.

from which priority is claimed.

NOTE: Must be referred to in oath or declaration. 37 CFR 1.55 and 163.

5. **Fee Calculation**

CLAIMS	AS FILED		
Number Filed	**Number Extra**	**Rate**	**Basic Fee $ 750.00**
Total Claims 53 -20=	33 x	$ 18.00	594.00
Independent Claims 6 -3=	3 x	$ 84.00	252.00
Multiple Dependent Claim(s), If Any	0 x	$280.00	0

[ ] Amendment canceling extra claims enclosed

[ ] Amendment deleting multiple dependencies enclosed

[ ] Fee for extra claims is not being paid at this time

NOTE: If the fee for extra claims are not paid on filing they must be

6. **Small Entity Statement**

[ ] Verified statement that this is a filing by a small entity under 37 CFR 1.9 and 1.27.

Filing Fee Calculation (50% of above) $_____

NOTE: If a verified statement is filed within 2 months of the date of payment of first fee then the excess fee paid will be refunded on request. Notice of January 20, 1983. 1027 TMOG 114.

7. **Fee Payment Being Made At This Time**

[X] Not Enclosed

[X] No filing fee is submitted. This and the surcharge required by 37 CFR 1.16(e) can be paid subsequently.

NOTE: Where the filing is a completion in the U.S. of an international application the fee must be paid.

[ ] Enclosed

[ ] filing fee $_____

[ ] recording assignment ($40.00; 37 CFR 1.21(h)(i)) $_____

[ ] petition fee for filing by other than all the inventors or person on behalf of the inventor where inventor refused to sign or cannot be reached. 37 CFR 1.47 and 1.17 (h) $_____

Total fees enclosed $_____

8. **Method of Payment of Fees**

[ ] check in the amount of $_____

[ ] charge account No. 12-0415 in the amount of $_____ A duplicate of this transmittal is attached.

NOTE: Fees should be itemized is such a manner that it is clear for which purpose the fees are paid. 37 CFR 1.22(b).

9. **Authorization to Charge Additional fees**

[ ] The Commissioner is hereby authorized to charge the following additional fees which may be required to Account No. 12-0415:

[ ] 37 CFR 1.16 (filing fees and presentation of extra claims)

[ ] 37 CFR 1.17 (application processing fees)

[ ] 37 CFR 1.18 (issue fee at or before Mailing of Notice of Allowance, pursuant to 37 CFR 1.311(b))

NOTE: 37 CFR 1.28(b) requires "Notification of any change in loss of entitlement to small entity status must be filed in the application...prior to paying... issue fee".

10. **Instructions As To Overpayment**

[ ] Credit Account No. 12-0415 [ ] refund

METHODS AND APPARATUS FOR GENERATING IMAGES

CROSS REFERENCE TO RELATED APPLICATIONS

This application is related to the following Patent Applications: US Patent Application Serial No._____ filed September 10, 2003, entitled "Printing Digital Documents" (HP reference 200207150-1; Attorney docket 621239-6); US Patent Application Serial No._____ filed September 10, 2003, entitled "Location Patterns And Methods And Apparatus For Generating Such Patterns" (HP reference 200310542-1; Attorney docket 621241-9); US Patent Application Serial No._____ filed September 10, 2003, also entitled "Location Patterns And Methods And Apparatus For Generating Such Patterns" (HP reference 200310543-1; Attorney docket 621242-7); British Patent Application No._____ filed September 10, 2003, entitled "Methods, apparatus and software for printing location pattern" (HP reference 200300566-1; Attorney docket JL3824); and, British Patent Application No._____ filed September 10, 2003, entitled "Printing of documents with position identification pattern" (HP reference 200310132-1; Attorney docket ASW1329).

FIELD OF THE INVENTION

The present invention relates to methods and apparatus for generating position identifying pattern, which can be detected by a suitable detection system. The pattern may be applied to a product such as a document, which may be a form, label or note pad, or any other form of product suitable for such marking, such as a packaging product.

BACKGROUND TO THE INVENTION

It is known to use documents having such position identification pattern in combination with a pen having an imaging system, such as an infra red sensitive camera, within it, which is arranged to image a small area of the page close to the pen nib. The pen includes a processor having image processing capabilities and a memory and is triggered by a force sensor in the nib to record images from the camera as the pen is moved across the document. From these images the pen can determine the position of any marks made on the document by the pen. The pen markings can be stored directly as graphic images, which can then be stored and displayed in combination with other markings on the document. In some applications the simple recognition that a mark has been made by the pen on a predefined area of the document can be recorded, and this information used in any suitable way. This allows, for example, forms with check boxes on to be provided and the marking of the check boxes with the pen detected. In further applications the pen markings are analysed using character recognition tools and stored digitally as text. Systems using this technology are available from Anoto AB and described on their website www.Anoto.com.

In order to allow documents to be produced easily with the position identifying pattern on them, it is desirable for the pattern to be suitable for printing on the types of printer that are readily available to a large number of users, such as an ink jet, laser jet or LEP printer. These are digital printers and typically have a resolution of 300, 600 or 1200 dots per inch, and the accuracy with which each dot can be located is variable. Also such printers are generally either monochrome, or, if they are colour printers, have only a small number of ink colours. Therefore, if it is desired to print position coding pattern on a part of a product which has human visible content on it as well, it can be a problem to ensure that the position

identifying pattern can be distinguished from the content by the reading device, and that the content remains clearly visible to the human eye, and distinguishable over the content.

SUMMARY OF THE INVENTION

According to a first as aspect of the invention there is provided a method of generating an image comprising a position identifying pattern and a content feature, the method comprising the steps of: generating the pattern and the content feature each as a plurality of graphical elements, and superimposing the content feature and the pattern, wherein the content elements are smaller than the pattern elements in at least one dimension. This can enable the pattern elements within the superimposed area to be machine read, for example by a digital pen.

The step of generating the content feature may comprise the steps of: defining the content feature, determining whether the content feature is to be superimposed on the pattern and, if it is, converting the content feature so that it comprises said content elements. This ensures that substantially any content feature can be printed with the pattern. Clearly some initial content features will be modified more than others in the conversion process to enable them to be distinguished from the pattern. Content features which are already formed from a number of graphical elements may simply require changes to the size or spacing of those elements. Content features which are initially solid colour, for example solid black, will need to be broken down into separate graphical content elements.

The method may comprise, before the converting step, determining whether the content feature already comprises said content elements and, only if it does not, performing the converting step. This allows

features which are already in a form which can be superimposed on the pattern, without preventing the pattern from being read, to be printed in their original form without undergoing any further modification.

The content marks may be smaller in two dimensions, which may be orthogonal dimensions, than the pattern marks, and may each be smaller in area than the pattern marks.

The difference in size between the pattern elements and the content elements, which is required to enable the pattern to be machine read, will depend on the details of the reading device. If the reading device is arranged to recognize marks in a predetermined range of sizes as being pattern elements, then the content elements need to be of a size that is well outside that range to ensure that the reading device does not erroneously identify the content elements as pattern elements. For example the content elements may be no bigger than half as big, in said one dimension, as the pattern elements. Where the content elements comprise discrete dots, they may be, on average, no bigger than a third, or even a quarter, of the area of the pattern elements.

When applied to a product the pattern elements may each be formed from a plurality of dots or pixels merged together to form a substantially solid mark, and the content elements may each be formed from at least one dot or pixel. This is how the product can be printed on a printer, such as an inkjet, laser jet or LEP printer. Such printers apply ink or toner in a large number of discrete areas, or pixels, which are the smallest areas that the printer can mark individually. The content elements may therefore each comprise a single pixel, thereby being as small as the printer can make them.

Alternatively they may each be made up of a plurality of pixels merged together into a single mark.

The pattern and the content may be printed substantially simultaneously in a one-pass printing process, i.e. on a single pass of a carrier through the printer. This allows the product, which may be a document, label, packaging article, or any other printed product, to be printed on demand on ordinary plain paper, card or other carrier material. Alternatively the content and the pattern may be printed onto the product separately, for example the content may be printed onto the product which has already been printed with the position identifying pattern.

The present invention is particularly suitable to monochrome printing. However, it can also be used with colour printers, and may indeed be advantageous under some circumstances. For example, colour printers can often be set to print in grey scale, which causes them to mix the different coloured toners, such as cyan, magenta and yellow, to produce different shades of grey. When operating in this mode colour printers can advantageously be operated according to the invention. Also where a colour printer has run out of one or more ink colours it may become necessary to print the content and the position identifying pattern using the same colour, for example to print some of the content in black ink as well as the pattern. Again, in these circumstances, the present invention can usefully be used.

The density of the content elements, which may for example be measured as the total area of content elements per unit area of the image, may be greater than the density of the pattern elements, which may be measured as the total area of the pattern elements per unit area of the image. As the density of the content elements

increases the visibility, to a human reader, of the content over the pattern increases, but the ease with which the pattern can be machine read by a reading device, such as a digital pen, decreases. For example, where the content is to be applied as a grey scale, the density may be measured as the grey scale of the content. This is particularly applicable to monochrome printing methods. Where colour printing or marking methods are used for the content, the density may be defined as the average reflectivity of the defined content within a particular wavelength. For example if the pattern is to be produced in some regions using a marking material having a reflectivity in a particular wavelength, then the density can be defined as the average reflectivity of the content within that range of wavelengths. Other measures of density may also be used. For example, where the content is to be applied as a grey scale, the density may be measured as the grey scale of the content. This is particularly applicable to monochrome printing methods. Where colour printing or marking methods are used for the content, the density may be defined as the average reflectivity of the defined content within a particular wavelength. For example if the pattern is to be produced in some regions using a marking material having a reflectivity in a particular wavelength, then the density can be defined as the average reflectivity of the content within that range of wavelengths.

The minimum possible contrast between the individual pattern marks and the content, which allows the reading device to detect the pattern, depends on various factors relating to the reading device, including the resolution of its imaging device and the processing methods it uses to analyse the pattern.

According to a second aspect of the invention there is provided a corresponding system for generating an image.

According to a third aspect of the invention there is provided a product having a position identifying pattern and a content feature applied to it, wherein the pattern comprises a plurality of discrete pattern marks each being of at least a predetermined size, the content feature comprises content marks, the content and the pattern are superimposed on each other within at least an area of the product, said area having two dimensions, and within said area the content marks are smaller than the pattern marks in at least one of the dimensions.

According to a fourth aspect of the invention there is provided a method of analysing a position identifying pattern on a product, the product having thereon the position identifying pattern comprising a plurality of pattern elements and a content feature comprising a plurality of content elements, the content elements being smaller than the pattern elements, the method comprising the steps of forming an image of an area of the pattern and the content, and processing the image to extract the pattern from the content on the basis of the relative sizes of the pattern elements and the content elements.

A corresponding system for analysing a position on a product is also provided.

According to a further aspect of the invention there is provided a data carrier carrying data arranged to control a computer system to operate as a system according to the invention, or to carry out the methods of the invention.

The data carrier can comprise, for example, a floppy disk, a CDROM, a DVD ROM/RAM (including +RW, -RW), a hard drive, a non-volatile memory, any form of magneto optical disk, a wire, a transmitted signal (which may comprise an internet download, an ftp transfer, or the like), or any other form of computer readable medium.

Preferred embodiments of the present invention will now be described by way of example only with reference to the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

Figure 1 shows a document according to an embodiment of the invention and a digital pen according to and embodiment of the invention;

Figure 2 shows a part of a position identifying pattern on the document of Figure 1;

Figure 3 shows a part of the position identifying pattern of the document of Figure 1 with a content feature superimposed thereon;

Figure 4 shows a part of the position identifying pattern of the document of Figure 1 with a darker content feature superimposed thereon;

Figure 5 shows a system, according to an embodiment of the invention, for printing the document of Figure 1;

Figure 6 shows some of the functional units within the computer of the system of Figure 5;

Figure 7 shows a part of a position identifying pattern and content on a document according to a further embodiment of the invention; and

Figure 8 shows part of a process according to an embodiment of the invention for analysing the pattern and content on the document of Figure 1.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring to Figure 1, a document 2 according to an embodiment of the invention for use in a digital pen and paper system comprises a carrier 3 in the form of a single sheet of paper 4 with position identifying markings 5 printed on some parts of it. The markings 5, which are not shown to scale in Figure 1, form a position identifying pattern 6 on the document 2. Also printed on the paper 4 are further markings 7 which are clearly visible to a human user of the document, and which make up the content of the document 2. The content 7 is in the form of a number of lines which extend over, and are therefore superimposed upon, the pattern 6.

The pen 8 comprises a writing nib 10, and a camera 12 made up of an infra red (IR) LED 14 and an IR sensor 16. The camera 12 is arranged to image a circular area of diameter 3.3mm adjacent to the tip 11 of the pen nib 10. A processor 18 processes images from the camera 12 taken at a specified sample rate. A pressure sensor 20 detects when the nib 10 is in contact with the document 2 and triggers operation of the camera 12. Whenever the pen is being used on an area of the document 2 having the pattern 6 on it, the processor 18 can determine from the pattern 6 the position of the nib

10 of the pen whenever it is in contact with the document 2. From this it can determine the position and shape of any marks made on the patterned areas of the document 2. This information is stored in a memory 22 in the pen as it is being used. When the user has finished marking the document 2, this is recorded in a document completion process, for example by making a mark with the pen 8 in a send box 9. The pen is arranged to recognise the pattern in the send box 9 and send the pen stoke data to a pen stroke interpretation system in a suitable manner, for example via a radio transceiver 24 which provides a Bluetooth radio link with an internet connected PC. Suitable pens are available from Logitech under the trade mark Logitech Io.

Referring to Figure 2, the position identifying pattern 6 is made up of a number of graphical elements in the form of black ink dots 30 arranged on an imaginary grid 32. The grid 32, which is shown in Figure 2 for clarity but is not actually marked on the document 2, can be considered as being made up of horizontal and vertical lines 34, 36 defining a number of intersections 40 where they cross. The intersections 40 are of the order of 0.3mm apart, and the dots 30 are of the order of 100μm across. One dot 30 is provided at each intersection 40, but offset slightly in one of four possible directions up, down, left or right, from the actual intersection 40. The dot offsets are arranged to vary in a systematic way so that any group of a sufficient number of dots 30, for example any group of 36 dots arranged in a six by six square, will be unique within a very large area of the pattern. This large area is defined as a total imaginary pattern space, and only a small part of the pattern space is taken up by the pattern on the document 2. By allocating a known area of the pattern space to the document 2, for example by means of a co-

ordinate reference, the document and any position on the patterned parts of it can be identified from the pattern printed on it. An example of this type of pattern is described in WO 01/26033.

Referring to Figure 3, the content markings 7 are made up of a regular square array of discrete, equally spaced, graphical elements, in the form of content dots 50, each of which is significantly smaller in both the horizontal and vertical dimensions, and in area, than each of the pattern dots 30. The content dots 50 are also spaced apart in both the horizontal and vertical directions. In this case the content dots 50 are each formed from a single dot or pixel of a 1200dpi printer, and each dot is separated from the adjacent dots 50, both vertically and horizontally, by a space equivalent to the size if one single printer pixel. They therefore have a nominal diameter of 21μm, and are spaced apart so that their centres are spaced at intervals of twice their diameter, i.e. 42μm. If the content dots 50 were exactly circular and had a diameter of exactly 21μm, then the content dots 50 would cover about 20% of the area to which they are applied, the spaces between them would make up the other 80%. In practice, each printer dot is arranged to be larger in diameter than the spacing between the dot centres, so as to ensure that total coverage is achieved in a black area where all of the dots are applied. Therefore the coverage produced by the content dots 50 will be higher than 20%. Assuming the pattern dots are 100μm in diameter, they cover about 9% of the area to which they are applied. This means that, to the human eye, the content is clearly visible and distinguishable as a darker shade of grey over the position identifying pattern.

Referring back to Figure 1, the processor 18 in the pen 8 receives a digital image of the combined pattern and content, as shown in

Figure 3, from the camera 12 and then processes the image in a known manner to identify the pattern dots 30. The processor 18 can identify the pattern dots 30 provided they are within a predetermined size range around 100 μm diameter, have at least a predetermined contrast with the background, defined as the relative level of absorption of light within a specific range of wavelengths, and are spaced apart with a grid spacing that is within a predetermined range around 300 μm. Therefore, because the content dots 50 are considerably smaller than the acceptable range of pattern dot sizes, and have a completely different spacing from the pattern dots 30, and produce a light enough grey scale to maintain sufficient contrast with the pattern dots 30, the pen can still identify the pattern dots 30 where the content 7 is superimposed on the pattern. The processor then analyses the positions of the pattern dots 30 and determines from them the position of the imaged area within the total pattern space. This process is then repeated at each sample period, so that the pen can determine the position of pen strokes made on the document 2 as they are made. This pen stroke data is stored as in the pen's memory 22 for transmission to a pen stroke interpretation device as described above.

The density, or grey scale, of the content dots can vary up to a certain limit, above which the pen 8 is unable to reliably read the pattern 7. Using the normal grey scale where 0 represents black and 255 represents white, a grey scale of from 255 down to about 200, which represents about 30% coverage of black ink on a white carrier, can be used with the pen 8. Figure 4 shows an area of a document in which the pattern dots 30 and the content dots 50 are the same size as in Figure 3, but the content dots are closer together covering about 75% of the document surface. In this case the contrast

between the pattern dots 30 and the surrounding areas of content dots 50 is not sufficient for the pen 8 described above to be able to read the pattern dots.

Referring to Figures 5 and 6, a very simple system according to an embodiment of the invention for producing printed documents having the position identifying pattern on them comprises a personal computer (PC) 200 and a printer 202. The PC 200 has a screen 204, a keyboard 206 and a mouse 208 connected to it to provide a user interface 209 as shown generally in Figure 6. As also shown in Figure 6, the PC 200 comprises a processor 210 and a pattern allocation module 212 which is a software module stored in memory. The pattern allocation module 212 includes a definition of a total area of pattern space and a record of which parts of that total area have been allocated to specific documents, for example by means of coordinate references. The PC 200 further comprises a printer driver 214, which is a further software module, and a memory 216 having electronic documents 218 stored in it. The user interface 209 allows a user to interact with the PC 200.

The printer 202 can be any printer which has sufficient resolution to print the pattern dots 30 and the content dots 50. In this case it is a 1200 dots per inch (dpi) monochrome laser jet printer. It will be appreciated that the dimensions of the content dots 50 correspond to the dimensions of single pixel of ink from a 1200 dpi printer, and that the spacing between the content dots 50 is twice the spacing of the printer pixels. This enables the printer to print the content dots 50 as single ink dots and the pattern dots 30 as groups of ink dots, for example about 12 dots. The printer dots are not exactly circular but each comprise an irregular mark of ink on the document 2. However the exact shape of the content dots 50 is not important as the human

eye cannot see their shape, and the pattern dots 30, because they are made up of a group of printer dots, are close enough to a regular shape to be read by the pen 8. Because they can be distinguished by the pen 8 by virtue of their size, the pattern dots 30 and content dots 50 can be printed using the same type of ink from the monochrome printer. Where a colour printer is used, the ink which is used for the pattern, which would typically be a black ink, can also be used for part of the content where appropriate.

In order to produce the printed document 2 the processor 210 retrieves an electronic document 218, which may be in the form of a PDF file, from the memory 216 and sends it to the printer driver together with instructions as to whether it is to be printed with pattern or not. The electronic document 218 contains a definition of the content 7, and the areas of the document 2 which can have the pattern 6 printed on it. The printer driver then determines from the instructions received whether the document is to be printed with pattern or not. If the document is to be printed without pattern on it, the content is sent for printing. If the document is to be printed with pattern on, the printer driver converts checks the nature of the content to determine whether it is already made up of graphical elements of a suitable format to enable the pattern to be read when the pattern and content are superimposed. If the content is already made up of suitable graphical content elements, then the printing process can proceed. If the content is not suitable made up, for example if it includes areas of solid black, then it is converted so that it is made up entirely of content elements 50 as described above.

When it is determined that the content is all in a suitable format, the printer driver 214 requests the required amount of pattern from the pattern allocation module 212 which allocates by means of

coordinate references an area of the pattern space to the document, generates the pattern 6 for that area using a pattern generation algorithm, and communicates the details of the pattern including the positions of all the required dots, back to the printer driver 214. The printer driver 214 then combines the content 7 and the pattern 6 into a single electronic file. This file therefore forms a combined electronic definition of both the pattern and the content. The printer driver then converts the content 7 and the pattern 6 to a format, such as a postscript file, suitable for the printer 202, and sends it to the printer which prints the content 7 and the pattern 6 simultaneously in a one-pass process, i.e. on a single pass of the paper, on which the document is printed, through the printer.

In practice the various components of the system can be spread out over a local network or the internet. For example the pattern allocation module 212 can be provided on a separate internet connected server so that it can be accessed by a number of users.

While the use of a 1200 dpi printer is described above, a similar result can also be achieved with lower resolution printers, such as 600 dpi printers. For a 600 dpi printer, the approximate diameter if each ink dot is 42μm. This is therefore still well below the minimum diameter for a dot that will be recognized by the pen 8 as a pattern dot. Therefore if the content is printed as single, spaced apart ink dots or pixels from a 600 dpi printer, and the pattern dots are printed as groups of ink dots, then the content and pattern can be printed simultaneously on a 600 dpi printer. Again the grey scale of the content dots needs to be kept at such a level that it will not interfere with the pens ability to identify the pattern dots. A maximum of about 30% grey has been found to work with the Logitec Io ™ pen.

If other methods of printing, such as offset printing are used, the resolution of the printed pattern and content can be much higher than with inkjet or laser jet printers. This gives greater freedom in the manner in which the content can be produced. Figure 7 shows an example of a document in which the position identifying pattern is again provided by a set of pattern dots 300, but the content is produced as a set of lines 302, using the same ink as for the dots. The content lines 302 are much narrower than the pattern dots 300 and spaced apart by a distance equal to about four times their width. This means that they cover about 20% of the document surface. In this case the pattern dots are again about 100μm in diameter and the content lines 302 are about 20μm in width and spaced apart at a pitch of about 100μm.

With the format of content and position identifying pattern described above, it is possible to use various image processing techniques within the pen processor 18 to help distinguish the content from the pattern, for a given resolution of the camera 12 in the pen 8. Because the content dots 50 are smaller than, and closer together than, the pattern dots 30, spatial filtering can be used to select, from all the marks on the document, those which make up the pattern dots 30. Spatial filtering is typically carried out using Fourier transforms, for example as described in WO 01/75783. Referring to Figure 8, in a modification to the embodiment described above, the processor 18 is arranged to first receive, at step 300, an image of a viewed area of the document 2. Then at step 302 it performs a Fourier transform on the image which produces a map of the image in the spatial frequency domain. Next at step 304, the elements of the spatial frequency domain map which correspond to the spatial frequency of

the pattern 6 are selected, and the elements which correspond to the spatial frequency of the content dots 50 are removed using a low pass filtering process. At step 306, the frequency domain map is transformed back to a new image, by reverse Fourier transform, to produce an image containing the pattern 6 but not the content 7. The modified image is then analysed by the processor 18 in the normal way to determine the position of the pattern dots 30 at step 308.

When this Fourier transform method is used, the ability of the processor 18 in the pen 8 to distinguish the pattern 6 from the content 7 is increased, so the content 7 can be made darker than that shown in Figure 3. For example the content shown in Figure 4 could potentially be distinguished using this method. Also the lined content of Figure 7 can more easily be distinguished using the Fourier transform method since the content lines only have a spatial frequency in one direction, and the method of removing them is therefore simplified.

WE CLAIM:

1. A method of generating an image comprising a position identifying pattern and a content feature, the method comprising the steps of:

generating the pattern and the content feature as a plurality of graphical pattern elements and a plurality of graphical content elements respectively, and

superimposing the content feature and the pattern,

wherein the content elements are smaller than the pattern elements in at least one dimension.

2. A method according to claim 1 wherein the content elements are spaced apart from each other in said one dimension.

3. A method according to claim 1 wherein the pattern and the content are each formed by the application of a marking material to a product.

4. A method according to claim 3 wherein the marking material is the same for the pattern and the content.

5. A method according to claim 2 wherein the pattern and the content are each formed by the application of a marking material to a product.

6. A method according to claim 5 wherein the marking material is the same for the pattern and the content.

7. A method according to claim 3 wherein the pattern and the content are applied to the product in a one-pass process.

8. A method according to claim 4 wherein the pattern and the content are applied to the product in a one-pass process.

9. A method according to claim 5 wherein the pattern and the content are applied to the product in a one-pass process.

10. A method according to claim 6 wherein the pattern and the content are applied to the product in a one-pass process.

11. A method according to claim 1 wherein the step of generating the content feature comprises the steps of:

defining the content feature, determining whether the content feature is to be superimposed on the pattern and, if it is, converting the content feature so that it comprises said content elements.

12. A method according to claim 11 comprising, before the converting step, determining whether the content feature already comprises said content elements and, only if it does not, performing the converting step.

13. A method according to claim 2 wherein the step of generating the content feature comprises the steps of:

defining the content feature, determining whether the content feature is to be superimposed on the pattern and, if it is, converting the content feature so that it comprises said content elements.

14. A method according to claim 13 comprising, before the converting step, determining whether the content feature already comprises said content elements and, only if it does not, performing the converting step.

15. A method according to claim 4 wherein the step of generating the content feature comprises the steps of:

defining the content feature, determining whether the content feature is to be superimposed on the pattern and, if it is, converting the content feature so that it comprises said content elements.

16. A method according to claim 15 comprising, before the converting step, determining whether the content feature already comprises said content elements and, only if it does not, performing the converting step.

17. A method according to claim 6 wherein the step of generating the content feature comprises the steps of:

defining the content feature, determining whether the content feature is to be superimposed on the pattern and, if it is, converting the content feature so that it comprises said content elements.

18. A method according to claim 17 comprising, before the converting step, determining whether the content feature already comprises said content elements and, only if it does not, performing the converting step.

19. A method according to claim 7 wherein the step of generating the content feature comprises the steps of:

defining the content feature, determining whether the content feature is to be superimposed on the pattern and, if it is, converting the content feature so that it comprises said content elements.

20. A method according to claim 19 comprising, before the converting step, determining whether the content feature already comprises said content elements and, only if it does not, performing the converting step.

21. A method according to claim 8 wherein the step of generating the content feature comprises the steps of:

defining the content feature, determining whether the content feature is to be superimposed on the pattern and, if it is, converting the content feature so that it comprises said content elements.

22. A method according to claim 21 comprising, before the converting step, determining whether the content feature already comprises said content elements and, only if it does not, performing the converting step.

23. A method according to claim 9 wherein the step of generating the content feature comprises the steps of:

defining the content feature, determining whether the content feature is to be superimposed on the pattern and, if it is, converting the content feature so that it comprises said content elements.

24. A method according to claim 23 comprising, before the converting step, determining whether the content feature already comprises said content elements and, only if it does not, performing the converting step.

25. A method according to claim 10 wherein the step of generating the content feature comprises the steps of:

defining the content feature, determining whether the content feature is to be superimposed on the pattern and, if it is, converting the content feature so that it comprises said content elements.

26. A method according to claim 25 comprising, before the converting step, determining whether the content feature already comprises said content elements and, only if it does not, performing the converting step.

27. A method according to claim 1 wherein the content elements are smaller than the pattern elements in two dimensions.

28. A method according to claim 1 wherein the content elements are each smaller in area than each of the pattern elements.

29. A method according to claim 1 wherein the pattern elements are each formed from a plurality of pixels merged together to form a substantially solid element.

30. A method according to claim 29 wherein each of the content elements is formed as a single one of said pixels.

31. A method according to claim 1 wherein the density of the content elements within an area of the image is greater than the density of the pattern elements within said area.

32. A method according to claim 1 wherein the elements making up the content feature are arranged in a regular array.

33. A method according to claim 32 wherein the elements in the array are equally spaced.

34. A method according to claim 3 wherein the pattern and the content are applied to the product by a printer.

35. A system for generating an image comprising a position identifying pattern and a content feature, the system being arranged to generate the content feature and the pattern, such that they are each made up of graphical elements and are superimposed on each other, and such that the elements of the content are smaller in at least one dimension than the elements of the pattern.

36. A system according to claim 35 comprising a marking device arranged to generate the image by applying marking material to a product.

37. A system according to claim 36 wherein the marking device is a printer.

38. A system according to claim 36 wherein the marking device is arranged to apply the pattern elements and the content elements using a marking material which is the same for the pattern elements and the content elements.

39. A system according to claim 36 wherein the marking device is arranged to apply the elements to the product by applying marking material to the product in a plurality of dots to produce the pattern marks and the content marks.

40. A system according to claim 39 wherein the marking device is arranged to form each of the pattern elements from a plurality of said dots.

41. A system according to claim 39 wherein the marking device is arranged to from each of the content elements from at least one of said dots.

42. A system according to claim 39 wherein the marking device is arranged to form each of the content elements from a single one of said dots.

43. A system according to claim 36 wherein the marking device is arranged to apply the pattern elements and the content elements to the product in a one-pass process.

44. A system for applying a position identifying pattern to a product, the system comprising:

marking means arranged to apply pattern marks to the product to make up a position identifying pattern and content marks to the product to make up a content feature, and

control means arranged to control the marking means so as to superimpose

the content and the pattern on each other within at least an area of the product, said area having two dimensions, and within said area to make the content marks smaller than the pattern marks in at least one of the dimensions.

45. A product having a position identifying pattern and a content feature applied to it, wherein:
the pattern comprises as a plurality of discrete pattern marks,
the content feature comprises a plurality of content marks,
the content and the pattern are superimposed on each other within at least an area of the product, said area having two dimensions, and
within said area the content marks are smaller than the pattern marks in at least one of the dimensions.

46. A method of analysing a position identifying pattern on a product, the product having on it the position identifying pattern comprising a plurality of pattern elements, and a content feature comprising a plurality of content elements, the content elements being smaller than the pattern elements, the method comprising the steps of:
forming an image of an area of the pattern and the content, and
processing the image to extract the pattern from the content on the basis of the relative sizes of the pattern elements and the content elements.

47. A method according to claim 46 wherein the pattern is extracted from the content using Fourier transforms.

48. A system for identifying a position identifying pattern on a product, the product having thereon the position identifying pattern comprising a plurality of pattern elements and a content feature comprising a plurality of content elements, the content elements being smaller than the pattern elements in at least one dimension, the system comprising:

a sensor arranged to form an image of an area of superimposed pattern and content, and

a processor arranged to process the image to extract the pattern from the content on the basis of the relative sizes of the pattern elements and the content elements.

49. A system according to claim 48 wherein the processor is arranged to extract the pattern from the content using Fourier transforms.

50. A data carrier carrying data arranged to control a computer system to operate as a system according to claim 48.

51. A data carrier carrying data arranged to control an imaging system to operate as a system according to claim 44.

52. A data carrier carrying data arranged to control a computer system to perform a method according to claim 1.

53. A data carrier carrying data arranged to control an imaging system to perform the method according to claim 46.

ABSTRACT OF THE DISCLOSURE

A method of generating an image comprising a position identifying pattern and a content feature comprises the steps of: generating the pattern and the content feature each as a plurality of graphical elements, and superimposing the content feature and the pattern. The content elements are smaller than the pattern elements in at least one dimension.

PATENT APPLICATION

DECLARATION AND POWER OF ATTORNEY FOR PATENT APPLICATION

ATTORNEY DOCKET NO. 200207059-1

B-5233 621240-1 EV301023981US

As a below named inventor, I hereby declare that:

My residence/post office address and citizenship are as stated below next to my name;

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled:

Methods And Apparatus For Generating Images

the specification of which is attached hereto unless the following box is checked:

( ) was filed on _____ as US Application No. or PCT International Application Number _____ and was amended on _____ (if applicable).

I hereby state that I have reviewed and understood the contents of the above-identified specification, including the claims, as amended by any amendment(s) referred to above. I acknowledge the duty to disclose all information which is material to patentability as defined in 37 CFR 1.56.

Foreign Application(s) and/or Claim of Foreign Priority

I hereby claim foreign priority benefits under Title 35, United States Code Section 119 of any foreign application(s) for patent or inventor(s) certificate listed below and have also identified below any foreign application for patent or inventor(s) certificate having a filing date before that of the application on which priority is claimed:

COUNTRY	APPLICATION NUMBER	DATE FILED	PRIORITY CLAIMED UNDER 35 U.S.C. 119
			YES: ___ NO: ___
			YES: ___ NO: ___

Provisional Application

I hereby claim the benefit under Title 35, United States Code Section 119(e) of any United States provisional application(s) listed below:

APPLICATION NUMBER	FILING DATE

U. S. Priority Claim

I hereby claim the benefit under Title 35, United States Code, Section 120 of any United States application(s) listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States application in the manner provided by the first paragraph of Title 35, United States Code Section 112, I acknowledge the duty to disclose material information as defined in Title 37, Code of Federal Regulations, Section 1.56(a) which occurred between the filing date of the prior application and the national or PCT international filing date of this application:

APPLICATION NUMBER	FILING DATE	STATUS (patented/pending/abandoned)

POWER OF ATTORNEY:

As a named inventor, I hereby appoint the following attorney(s) and/or agent(s) to prosecute this application and transact all business in the Patent and Trademark Office connected therewith:

Customer Number 022879

Place Customer Number Bar Code Label here

Send Correspondence to:	Direct Telephone Calls To:
HEWLETT-PACKARD COMPANY Intellectual Property Administration P.O. Box 272400 Fort Collins, Colorado 80527-2400	Richard P Berg (323) 934 2300

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Full Name of Inventor: Patrick Brouhon Citizenship: BE

Residence: 214 Chemin des Reposes 38410 Saint Martin d'Uriage France

Post Office Address: Same as Residence

Inventor's Signature _____ Date _____

DECLARATION AND POWER OF ATTORNEY FOR PATENT APPLICATION (continued)

ATTORNEY DOCKET NO. 200207059-1

Full Name of # 2 joint inventor: Ira Goldstein Citizenship: US

Residence: 790 Strawberry Hill Road Concord MA 01742

Post Office Address: Same as residence

Inventor's Signature _____ Date _____

Full Name of # 3 joint inventor: _____ Citizenship: _____

Residence: _____

Post Office Address: _____

Inventor's Signature _____ Date _____

Full Name of # 4 joint inventor: _____ Citizenship: _____

Residence: _____

Post Office Address: _____

Inventor's Signature _____ Date _____

Full Name of # 5 joint inventor: _____ Citizenship: _____

Residence: _____

Post Office Address: _____

Inventor's Signature _____ Date _____

Full Name of # 6 joint inventor: _____ Citizenship: _____

Residence: _____

Post Office Address: _____

Inventor's Signature _____ Date _____

Full Name of # 7 joint inventor: _____ Citizenship: _____

Residence: _____

Post Office Address: _____

Inventor's Signature _____ Date _____

Full Name of # 8 joint inventor: _____ Citizenship: _____

Residence: _____

Post Office Address: _____

Inventor's Signature _____ Date _____

HP Ref: 200207059
Our Ref: ASW1331

Fig 1

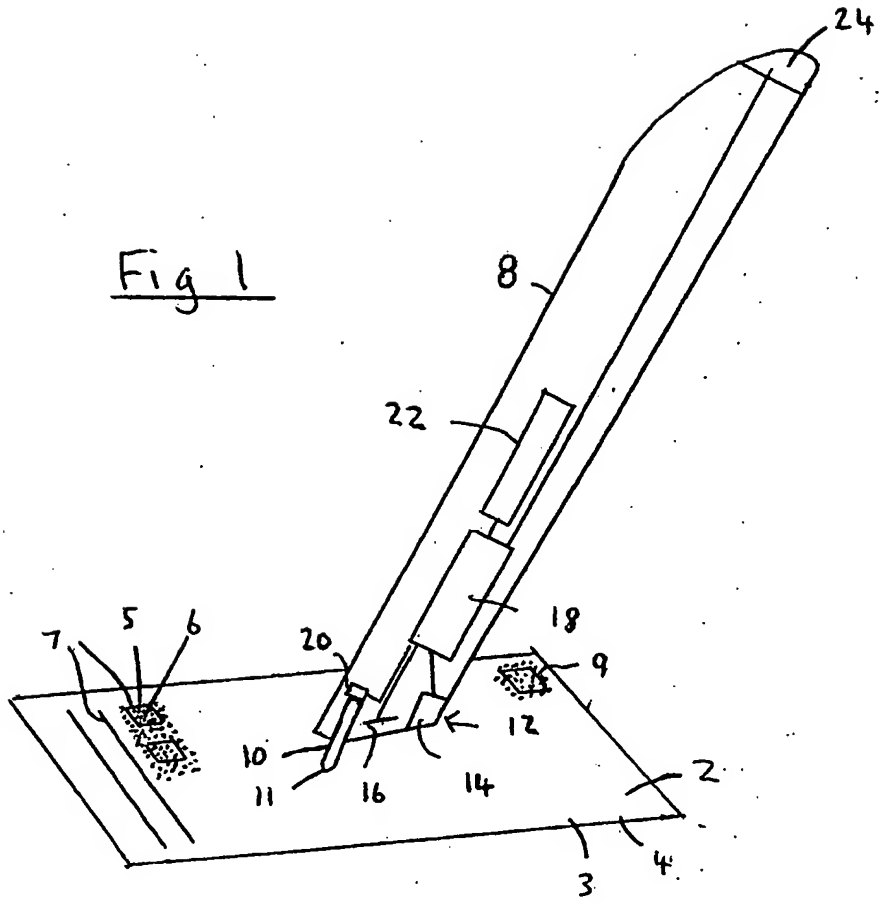
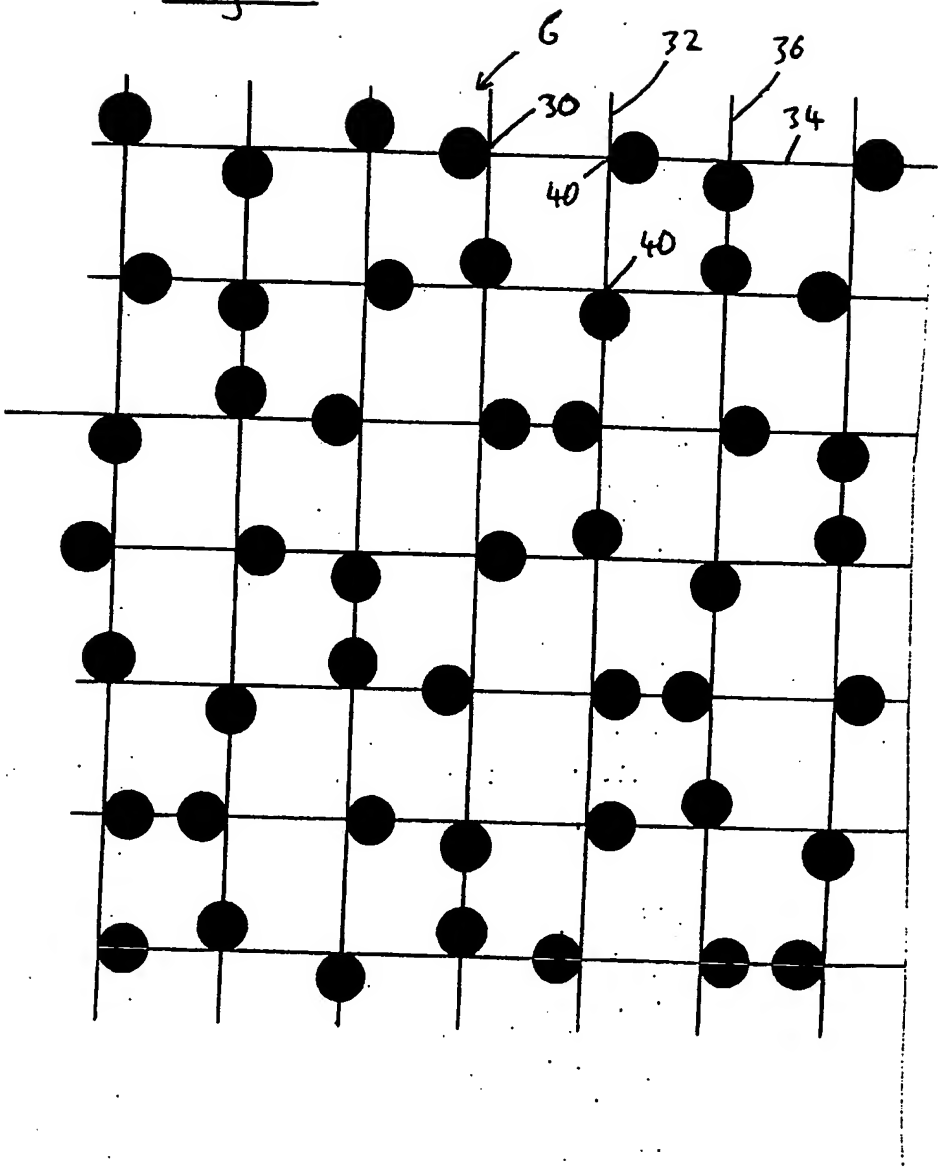


Fig 2



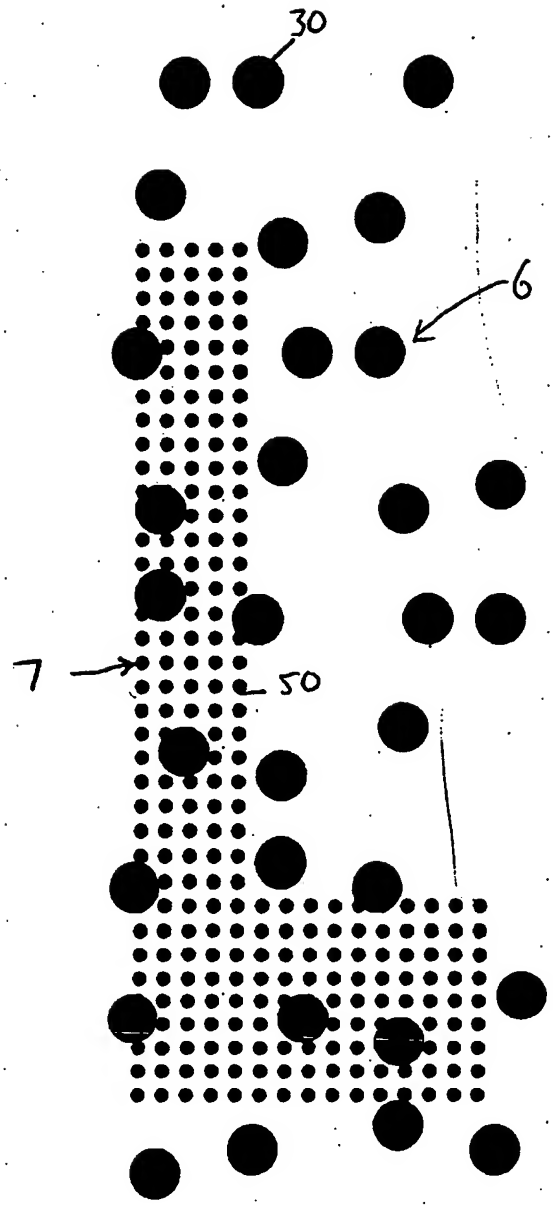


Fig 3

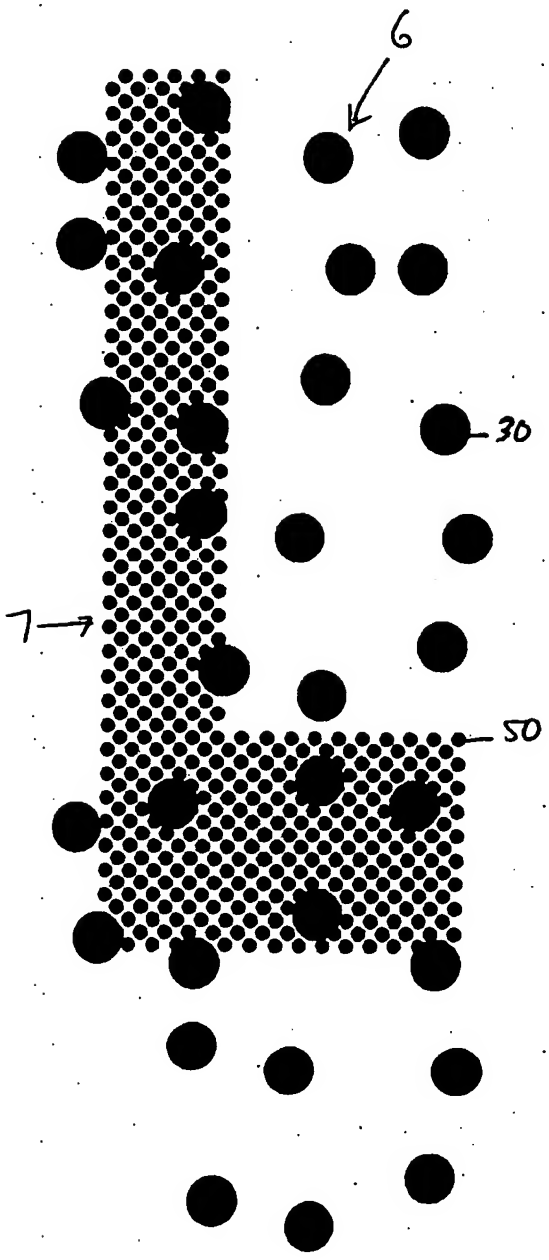


Fig 4

Fig 5

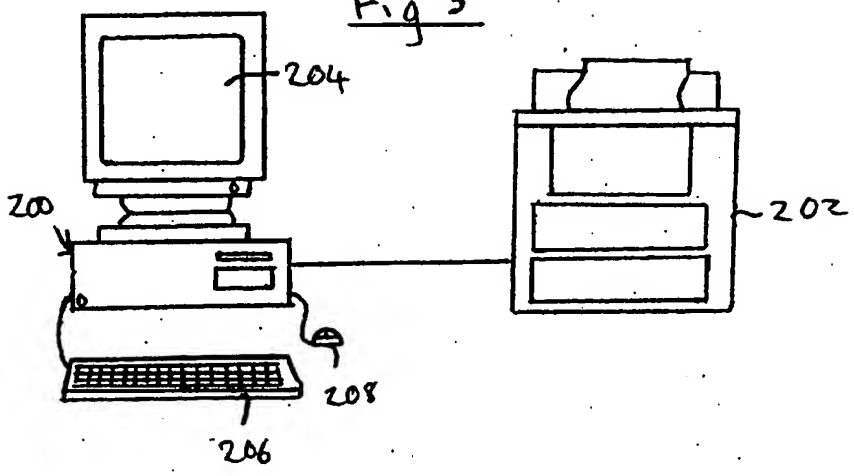

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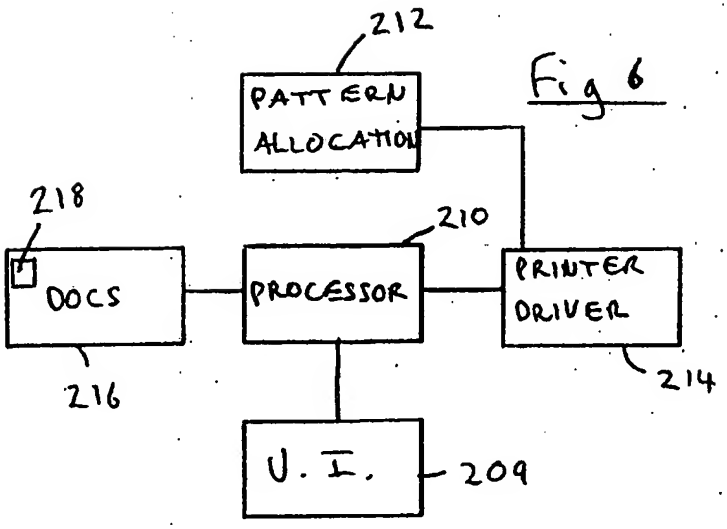
Fig 6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PATTERN ALLOCATION
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DOCS
PROCESSOR
PRINTER DRIVER
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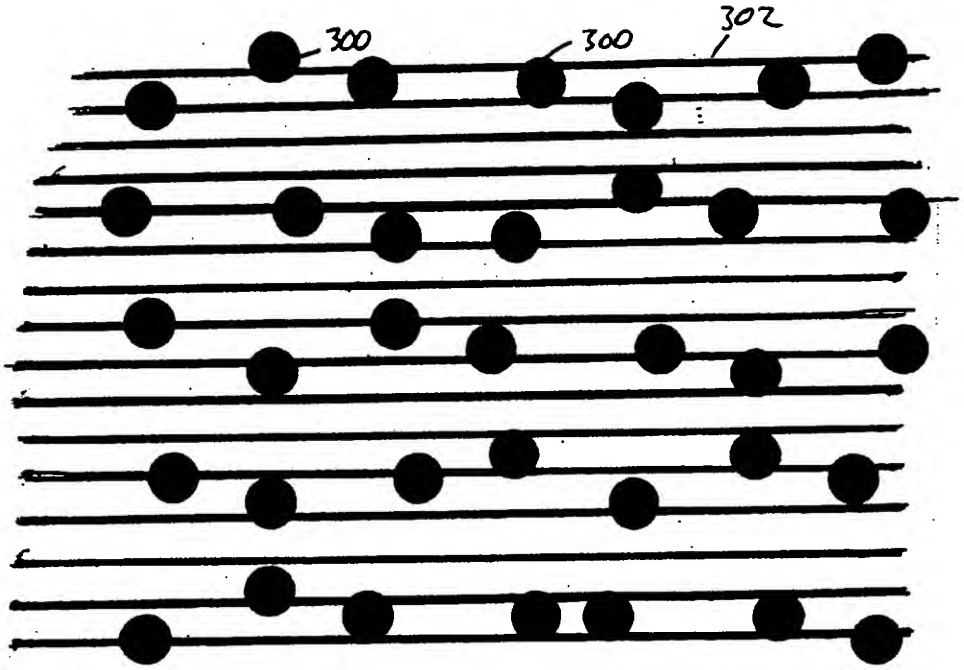
214
U. I.
209

Fig 7



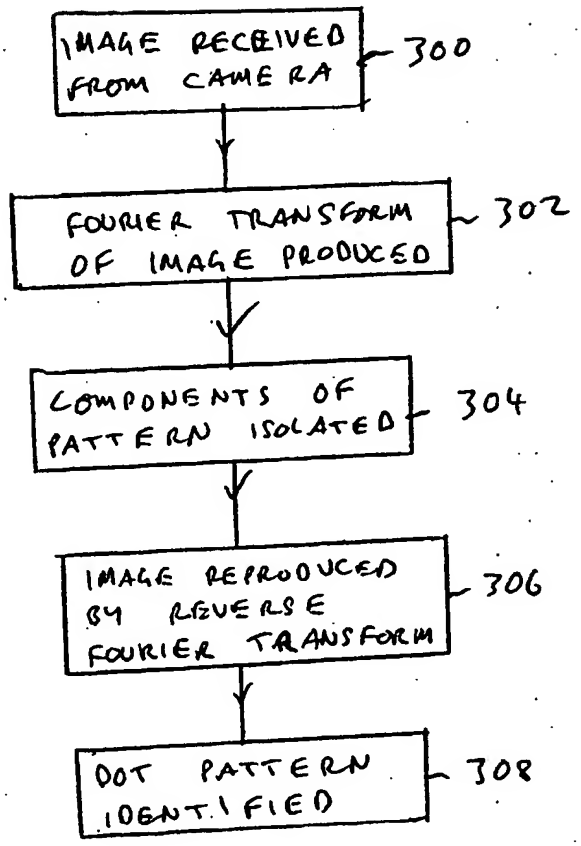


IMAGE RECEIVED FROM CAMERA
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FOURIER TRANSFORM OF IMAGE PRODUCED
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COMPONENTS OF PATTERN ISOLATED
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IMAGE REPRODUCED BY REVERSE FOURIER TRANSFORM
306
DOT PATTERN IDENTIFIED
308

Fig 8

EV301023981US

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant: Patrick BROUHON, et al.	Group: Not yet assigned
Serial No.: Not yet assigned	Examiner: Not yet assigned
Filed: Concurrently herewith	Our Ref: B-5233 621240-1
For: "METHODS AND APPARATUS FOR GENERATING IMAGES"	Date: September 10, 2003

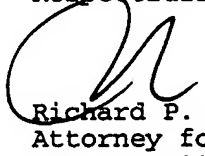
Mail Stop Patent Application
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

CROSS-REFERENCE TO RELATED APPLICATION(S)

Sir:

This application is related to the U.S. patent application invented by Terry M. NELSON, et al., entitled "LOCATION PATTERNS AND METHODS AND APPARATUS FOR GENERATING SUCH PATTERNS," which application is being filed on September 10, 2003 (Attorney Docket No. B-5235 621242-7); U.S. patent application invented by Terry M. NELSON, entitled "LOCATION PATTERNS AND METHODS AND APPARATUS FOR GENERATING SUCH PATTERNS," which application is being filed on September 10, 2003 (Attorney Docket No. B-5234 621241-9); and U.S. patent application invented by Andrew MACKENZIE, et al., entitled "PRINTING DIGITAL DOCUMENTS," which application is being filed on September 10, 2003 (Attorney Docket No. B-5232 621239-6).

Respectfully submitted,



Richard P. Berg
Attorney for Applicant
Reg. No. 28,145

LADAS & PARRY
5670 Wilshire Boulevard
Suite 2100
Los Angeles, CA 90036

Johnston,Suzanne

From: loles fores
Sent: Friday, July 16, 2004 2:21 AM
To: special-shipment_bcd@nonhp-spa.exch.hp.com; Leong, Ignatius; Fores, M Dolores (Loles)
Subject: 200207059-1 (II) >> Special Shipments Request (419841B5FB)

Special Shipments Request Id : 419841B5FB

About the requester :

- Requester Name : loles fores
- Extension : 2084
- Requester's Mail : loles.fores@hp.com
- Manager's Mail : ignatius.leong@hp.com
- Location : 72p1
- Account :

About the shipment :

- Ship To Company : Ira P. Goldstein
- Attention : Ira P. Goldstein
- Address : 790 Strawberry Hill Road
- City : Concord, MA 01742-5419
- Country : us
- Phone : 978-369-2152
- Zip : 01742-5419
- VAT Number :
- Required Delivery Date : 20/07/04
- Shipment Purpose : 24

- Invoice Type : No charge
- Method of payment for freight & duties expenses : You pay freight and duty expenses

About the material :

** Item : 1 **
Part N. : n/a Origin : spain Quantity : 1 Price : 10 Serial : n/a Description : business documents

Shipment instructions :

200207059-1 >> US Dec & US Assg re-sent + Application as filed

Special material :

- Dangerous/chemical product :
- Material with packaging :

- Material without packaging :
- Material with pallet :
- Large format printer with wheels :
- Building :
- Area/department :

****
* Special Shipments Web Site : *
* http://www.bpo.hp.com/SpecialShipments/ *
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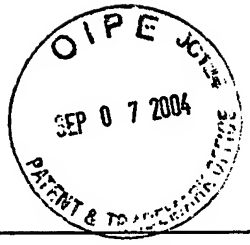


Johnston,Suzanne

From: Special-shipment bcd
Sent: Friday, July 23, 2004 1:25 AM
To: Fores, M Dolores (Loles)
Subject: FW: FF948407

SHIPMENT INFO:
SHIPMENT DELIVERED ON 21ST JULY.
BEST REGARDS,

SHIPPING DEPARTMENT

-----Original Message-----
From: BCD,SPECIAL-SHIPMENT (HP-Spain,exgen2)
Sent: Tuesday, July 20, 2004 9:37 AM
To: FORES,M DOLORES (HP-Sant Cugat del Valles,Loles)
Subject: FW: FF948407

Shipment info:
If you find any mistakes in the invoice below, please contact
Special Shipments. Carrier DHL, estimated date arrivaL 22/07/04

Borja
Special Shipments
935822929

-----Original Message-----
From: simone_giliberto@hp.com [mailto:simone_giliberto@hp.com]
Sent: Monday, July 19, 2004 3:46 PM
To: special-shipment_bcd@nonhp-spa.exch.hp.com
Cc: simone.giliberto@hp.com
Subject: FF948407

□&l1H
Hewlett Packard NO CHARGE INVOICE Invoice Date Invoice No Page
19JUL04 F900F48407 1
Ship From: Order Date Customer Order No
HEWLETT-PACKARD ESPANOLA S.A. 19JUL04 WEB#419841B5FB
BARCELONA DIVISION Order No
AV. GRAELLS 501 F9A013
E-08190 SANT CUGAT DEL VALLES
BARCELONA ESPANA
Ship To: Invoice To:
IRA GOLDSTEIN IRA GOLDSTEIN
790 STRAWBERRY HILL ROAD 790 STRAWBERRY HILL ROAD
CONCORD CONCORD

01742-5406 MASSACHUSSETS 01742-5406 MASSACHUSSETS

Attn: Attn:
IRA GOLDSTEIN

ULTIMATE DESTINATION:

000 UNITED STATES

SEL-VAT-ID #: ESB28260933

Estos productos,tecnologÕa o softwarn sido exportados de acuerdo con las
mativas de export locales y de USA.Sse permite su re-export de acuerdo c
dichas normativas quedando prohibidalquier actuaciÆn contraria a las mis

Carrier	Flight No	Bill of Lading	Term of Delivery	Method	Date Ship
DHL		4600244084	DDU	COURIER	19JUL04

Named Location:

Item No	Description	Qty Ship	Unit Price	Amount
0100	DPN-490900C	1	1.0000	1.00

Desc: Other Printed/Illustrated Cards
National HTS: 4909009000 U.S. HTS: 4909004040
National ECCN: NA U.S. ECCN: EAR99A
Serial No: NSN
Box No: F9NC-78608 Gross Weight: 0.50 Kgs
Country of Origin: SPAIN

Reason:Information material/quote/letter
Initiated By: HERNANDEZ MIGUEL A

Amount in U.S. Dollars

Total Boxes: 1 Weight: 0.50 KGS | Total value for customs: 1.00

I hereby certify that the information on this invoice is true and correct

NO CHARGE INVOICE: Value

(Signature) for Customs Purposes Only

*******End of Invoice******

These are the results of your query

Times given are local to the service area in which the shipment checkpoint is recorded

Airwaybill Number	Origin Service Area	Destination Service Area	Status
4600244084	Barcelona - Spain	Needham, MA - USA	Signed for by: I GOLDSTEIN Shipment delivered July 21, 2004 10:14

4600244084 - Detailed Report

Date	Time	Location Service Area	Checkpoint Details
July 19, 2004	17:40	Barcelona - Spain	Shipment picked up
July 19, 2004	18:11	Barcelona - Spain	Departing origin
July 20, 2004	02:48	Brussels - Belgium	Departed from DHL facility in Brussels - Belgium
July 20, 2004	05:22	New York City-Gateway, NY - USA	Arrived at DHL facility in New York City-Gateway, NY - USA
July 21, 2004	00:41	New York City-Gateway, NY - USA	Departed from DHL facility in New York City-Gateway, NY - USA
July 21, 2004	07:29	Needham, MA - USA	Scheduled for delivery
July 21, 2004	07:50	Needham, MA - USA	With delivery courier
July 21, 2004	23:15	Cologne - Germany	Arrived at DHL facility in Cologne - Germany
July 21, 2004	10:14	Needham, MA - USA	Shipment delivered

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant(s): Patrick BROUHON, et al.

U.S. Serial No.: 10/661,000

Group: 2854

Filing Date: September 10, 2003

Our Ref.: B-5233 621240-1

For: "METHODS AND APPARATUS FOR GENERATING IMAGES"

VERIFIED STATEMENT OF DETAILS OF EFFORTS TO REACH NONSIGNING INVENTOR (SUPPLEMENT TO STATEMENT OF FACTS IN SUPPORT OF FILING ON BEHALF OF NONSIGNING INVENTOR)

I, the undersigned, hereby state that the following attempts were made to reach the nonsigning inventor, Ira Goldstein, and that I am the person most knowledgeable of facts surrounding the below listed attempts to reach the nonsigning inventor of the above-identified application.

On July 22, 2004, I had a telephone conversation with Mr. Ira Goldstein. I asked Mr. Goldstein if he had received the courier package sent by Ms. Loles Fores of Hewlett-Packard Española, S.A., which contained a copy of the subject application as filed with the USPTO as well as a blank Declaration/Power of Attorney and an Assignment document. Mr. Goldstein confirmed that he had received the package and planned to review the documents within the next week.

On July 28, 2004, I attempted to contact Mr. Goldstein by telephone to inquire whether he had reviewed the papers and signed the Declaration/Power of Attorney and Assignment documents. When I called the telephone number at which I had previously contacted the inventor (978-369-2152), I received an automated message that said the number I was trying to reach was no longer in service.

To date, the application papers have not been returned to the Applicant and subsequent attempts to contact the inventor by telephone were unsuccessful because the last known telephone number was disconnected.

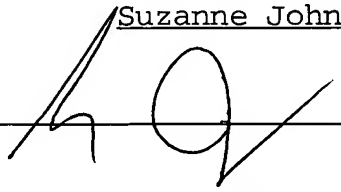
On information and belief, I believe that a diligent effort has been made to contact the nonsigning inventor, Ira Goldstein, in connection with this application.

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Date: 9/1/04

Typed/printed name of the person making this statement

Suzanne Johnston

Signature 

Post Office Address LADAS & PARRY, 5670 Wilshire Blvd., Suite 2100, Los Angeles, CA 90036